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## Use of the Memokath Urethral Stent in the management of ileal conduit stomal stenosis

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## ABSTRACT

**INTRODUCTION:** Ileal conduit stomal stenosis is a difficult complication to manage. Definitive treatment usually requires refashioning or a reconstruction of the conduit. There remains a need for minimally invasive procedures that can restore function to the stoma while avoiding the risks associated with a significant surgical procedure. This case illustrates a novel approach to the management of this complication.

**PRESENTATION OF CASE:** An 84 year old female with muscle-invasive bladder cancer underwent cystectomy with formation of an ileal conduit urinary diversion system. Her recovery was complicated by stomal stenosis leading to recurrent urinary tract infections. The Memokath Stent 045 is a thermo-expandable nickel–titanium stent designed for treatment of urethral strictures. The stent was inserted into the stoma under direct vision without the need for general anaesthesia or intraoperative radiography. The conduit remains patent 12 months after insertion and the metal stent showed no evidence of migration, calcification, oxidation or degradation.

**DISCUSSION:** The use of a thermo-expandable nickel–titanium stent is able to provide the patency required to treat ileal conduit stomal stenosis. In this case, insertion of the stent was a simple procedure and no adverse events or degradation of the stent was identified at 12 months after insertion. The need for a significant surgical procedure such as a refashioning or reconstruction was avoided and general anaesthesia was not required to perform the procedure.

**CONCLUSION:** This case report highlights the possibility of using the thermo-expandable Memokath Stent 045 as an alternative to the long-term management of ileal conduit stomal stenosis.

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## 1. Introduction

The ileal conduit urinary diversion system is commonly formed following radical cystectomy. It is regarded as the safest and simplest form of urinary diversion and it is the gold standard for which all other urinary diversion systems are compared against [1]. Complications associated with ileal conduit urinary diversion include those affecting the bowel, stoma, conduit and the uretero-intestinal anastomosis. The major consequences with any of the complications are injury to renal tissue compromising its function and breakdown of all or part of the urinary diversion system. Stomal stenosis is one such complication which can lead to secondary complications such as obstruction, infection and renal injury.

Ileal conduit stomal stenosis is a complication which is difficult to manage for both patients and doctors. The management options available include conservative approaches such as catheterisation

and mechanical dilation while definitive management involves refashioning the stoma or a reconstruction of the conduit [1].

Current minimally invasive approaches such as dilation are limited to cases where the site of stenosis is close to the level of the skin but often still require surgical intervention [2]. The authors present this unique case which illustrate the potential for an innovative, minimally invasive approach to the management of stomal stenosis utilising a nickel–titanium thermo-expandable urethral Memokath Stent 045 to maintain patency.

## 2. Presentation of case

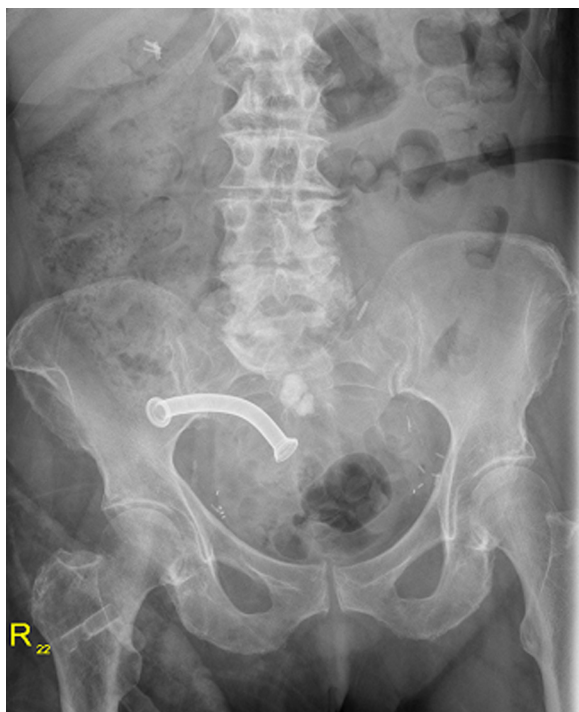
An 84 year old female presented with haematuria and lower urinary tract symptoms to our institution in 2013. She has no significant relevant medical history. She was subsequently managed and treated with a transurethral resection of bladder tumour, the histological results of the resection lead to a diagnosis of muscle-invasive nodular and papillary transitional cell carcinoma.

The patient underwent a cystectomy, urethrectomy, hysterectomy and bilateral salpingo-oophorectomy with pelvic lymph node dissection with formation of an ileal conduit. A Bricker end-to-side

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**Fig. 1.** An intraoperative image showing the metal Memokath 045 ureteric stent in the stomal orifice with 10 cm of a 5 French catheter inserted through the lumen to demonstrate patency.



**Fig. 2.** Abdominal radiograph of the patient three months after stent insertion. The 70 mm metal stent is observed without any signs of migration. Clinically, the ileal conduit is functioning well with no signs of irritation or degradation.

anastomosis was performed with the ileal conduit measuring 26 cm in length and ureteric stents were placed bilaterally. There were no significant intraoperative complications.

Within the first 24 h following the operation, the external aspect of the stoma became dark red and black colour in colour. Over the next week, necrotic tissue was evident on the external mucosal surface however there were no signs of infection. During the second

week, the base of the stoma began to regain a pink colour and was normal by the end of this week. A retrograde ileal conduitogram was attempted on day 16 but insertion of the catheter was unsuccessful due to suspected conduit stenosis. A repeat study was performed through the ureteric stents on day 19 which revealed a patent conduit and the ureteric stents were removed. Over the next week the rate of drainage from the stoma gradually declined. On day 26, the stoma had a 16 French Foley catheter inserted to achieve adequate drainage. On day 40 the size of the catheter was reduced to a 14 French due to difficulties with catheter insertion. Over the next five months, the conduit remained dependent on catheterisation for sufficient drainage. A conduitoscopy with stomal dilation using Hegar dilators was performed which confirmed a 45 mm segment of stenosis below the level of the skin, involving the level of the abdominal muscles.

Within these first 6 months the patient's recovery was also complicated by five urinary tract infections. As a result of the complications and increasingly difficult catheter changes, a 70 mm Memokath Stent 045 was inserted at seven months after the original procedure. Insertion of the stent was performed under IV sedation without the need for intraoperative radiography. Following insertion of the stent, the patient recovered well and has not required any further catheterisation. The patient commented that she is highly satisfied with the current result and has not experienced any pain or discomfort associated with the stent. The patient was reviewed at 3 and 12 months after insertion of the stent and during both assessments, there was no evidence of stent migration, calcification, oxidation or luminal obstruction and the stoma was fully functional. Abdominal radiography confirmed the stent was not deformed and there are no signs of any calcification on the inner aspect of the stent. This work has been reported in line with the CARE criteria [3].

### 3. Discussion

The ileal conduit is regarded as the standard urinary diversion system utilised in patients following cystectomy for bladder cancer [1]. A significant proportion of patients undergoing this procedure are elderly and studies have reported that the mean age of patients undergoing this procedure is approximately 60 years [4,5]. A gradual decline in health and functional status following the procedure often occurs [6,7]. As a result of advancing age, comorbidities and deconditioning, patients who develop complications related to the ileal conduit may not always be suitable for surgical intervention as the risks may outweigh the benefits. The introduction of new minimally invasive procedures that can achieve adequate patency of the conduit and stoma would be of benefit for many patients.

Ileal conduit stomal stenosis classically presents as a late complication with an insidious onset. The rate of this complication has been reported to be 0.7–8.5% and this variation is thought to be due to differences in technical skill levels of surgeons performing the procedure [2,8,9]. It is believed that chronic ischemia of the conduit may be a major contributing factor to the development of stenosis [10]. The risk of stenosis can be minimised during the formation of the ileal conduit with appropriate selection and handling of the isolated bowel segment [1,10]. Other risk factors include fascial constriction, retraction and local skin changes such as hyperkeratosis resulting from urine causing chronic irritation. Adequate care of the stoma is necessary to minimise the risk of stomal stenosis [1,2]. Considering the clinical course of the case presented by the authors it is highly likely that the primary causative factor was ischemia.

The Memokath Stent 045 is a thermo-expandable nickel–titanium stent designed for the long-term treatment of urethral strictures [11]. The authors believed that the size of this stent in conjunction with the thermo-expandable property



**Fig. 3.** Image of the stoma three months following stent insertion. The stoma was functioning normally and draining through the stent adequately.

made it a candidate for use in the treatment of ileal conduit stomal stenosis. In the presented case, the stent was inserted into the stoma under direct vision without the need for intraoperative radiography (Fig. 1). Stent insertion was quick and did not require a general anaesthetic, making it a more suitable treatment option for elderly and frail patients compared to a refashioning or reconstruction. The limitations of this approach is the possibility of stent migration, encrustation, oxidation and pressure necrosis. These potential issues arise from the constant exposure to urine and air when placed in the stoma [12]. These issues can be rapidly resolved due to the ease of removing the stent but ongoing review and monitoring remains important to detect complications early. The stent removal process involves exposing the stent to cold water which allows it to expand and uncoil, a procedure that can be performed under local anaesthetic.

The patient was reviewed at 3 and 12 months after insertion of the stent. On examination at both reviews, the stent was appropriately positioned with no signs of deterioration (Fig. 2). The stoma was fully patent with excellent urinary drainage and the patient has not required the use of catheters to facilitate drainage (Fig. 3). The patient commented that the stent does not impose any restrictions on her level of physical activity and was satisfied with the outcome.

With the presentation of this case report, the authors illustrated the application of a minimally invasive procedure which utilised a metal stent to treat ileal conduit stomal stenosis. The key learning points from this case is demonstrated by the approach having the advantage of not requiring a general anaesthetic and adequate patency can be achieved without a major surgical procedure, making it a suitable alternative for elderly or frail patients. The ease of reversibility of the procedure proves reassuring but ongoing monitoring is important in all cases.

#### 4. Conclusion

There remains a need for minimally invasive options to use in the treatment of ileal conduit stomal stenosis. This case report highlights the possibility of using the thermo-expandable Memokath Stent 045 as an alternative to the long-term management of ileal conduit stomal stenosis.

#### Conflict of interest

The authors have no conflicts of interest to declare. The research was self-funded with no external sponsors.

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#### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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#### Ethics approval

No ethics approval was required or requested for this case report.

#### Author contributions

T. Pan: Acquisition of data, interpretation of data and wrote the manuscript.

A. Al-Sameraai: Conception and design of the study, interpreted the data and revised the manuscript.

#### Guarantor

T. Pan is the guarantor for this case report.

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